SOCCER STADIUMS AS TOOLS OF ECONOMIC DEVELOPMENT

by

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A REPORT

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Abstract

Few things dominate American culture like sport. Sports function as a universal language, as something that people identify with. The provision of stadiums in the United States represents some of the largest public investments found on a municipal level. Over the past 10 years soccer has become one of the most popular sports in the U.S. Consequently, the provision of soccer stadiums is becoming an important economic issue. The lack of research regarding the economic impact of soccer stadiums and the techniques in which city planners can address the economic performance of soccer stadiums will be addressed in this study.

The study employs a multiple regression analysis to understand the relationship between economically successful sports stadium characteristics and the economic impact of soccer stadiums. The multiple regression analysis considers each of the 16 Major League Soccer stadiums in the U.S. and discovers the relationship between the economic impacts of each stadium and the presence of successful sports stadium characteristics at those stadiums.

The regression analysis resulted in a conditional estimate of the impact of successful sports stadium characteristics on the economic impact of soccer stadiums. No significance can be drawn between the economic impact of soccer stadiums and successful sports stadium characteristics. Although successful sports stadium characteristics have little impact on economic performance, planners should still encourage the use of successful characteristics in stadiums. Planners have the skill set to plan for stadiums that benefit the public economically, socially, psychologically, and environmentally. Planners must continue to find ways to ensure that soccer stadiums have a positive impact on the cities that build them.

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Dedication

To my parents Jeffery and Debra Kacirek for all of their support and love, thank you.

Chapter 1 - The Stadium Debate

Stadiums are a fundamental necessity for any major professional sport. This is obvious, but nonetheless important to remember that professional sports would not be possible without stadiums. It is also important to remember that stadiums are expensive. A common economic development tool is the use of sports stadiums as a way to foster development in low socio-economic neighborhoods or to revitalize blighted and struggling downtowns. In most situations, in order for a city to build a professional sports stadium, significant public funding must be attributed to the construction of the stadium. This means funding via taxes that could be used for schools, roads, parks, public work projects and other city expenses are instead used to build a sports stadium.

Cities are often willing to build sports stadiums as a means of economic development because they believe that a stadium will answer a number of wants in their community. Firstly they believe the stadium will result in some sort of economic impact. Secondly, cities acknowledge that sports are incredibly popular and that by housing a sports team the city and decision makers stand to benefit politically. That is to say, cities theoretically stand to benefit from building a sports stadium in that the stadium will answer to the demands of increasing economic development and increasing entertainment and culture amenities. With the demand for sports being high in the United States, the competition between cities to house major professional sports is high. Being seen as a “major league” city is something that large cities covet and having a professional sports team all but signifies this status. This demand places public policy makers in a bind. As Atlanta mayor Kasim Reed noted “fans have a love of sports in the United States of America. And no leader of a city wants to be a leader that loses a major sports franchise” (Cornish, 2013).

Unfortunately, professional sports owners realize this also. Former baseball owner Bill Veeck put it best “you don’t make money operating a baseball club. You make money selling it” (deMause & Cagan, 2008, p. 44). The easiest way for a franchise owner to increase the value of their team, and thus increase the sale price of their team, is to gain a revenue increase through forcing their home municipality to build a new stadium. New stadiums increase revenue through an uptick in ticket sales, gains from more luxury suites that sell at a higher price than the average seat, the selling of stadium naming rights and from issuing new personal seat licenses. All of these tactics result in an increase in revenue that the owners keep (deMause & Cagan, 2008). In order to get the construction of a new stadium, owners use a multitude of strategies with the most common and successful strategy coming in the form of a threat.

This “threat” can best be seen in the situation currently unfolding in St. Louis, MO. In the current year, 2015, the city of St. Louis, MO is facing a threat from one of its professional sports teams. The St. Louis Rams are threatening to move from St. Louis to a new stadium being built in the Los Angeles, CA area. The Rams will only stay in St. Louis if the city builds a new stadium. This threat is not new or singular to St. Louis. Throughout the sports landscape of the United States over the past 60 years franchise owners have used this threat. Chapter 3 will explain this threat in greater detail. The threat usually follows a general formula where franchise owners will threaten to move their team from the city they are located in if they do not receive a new stadium for their franchise. This puts cities in a bind; should the city raise taxes and divert funds from other needs in order to construct a new sports stadium or should the city call the owners bluff and risk the owner the moving the beloved and in-demand sports franchise to a more accommodating city.

Traditional media over the past 25 years has become more aware of this threat. The Miami Herald ran an article titled *Dismantling of Miami Marlins hurt efforts to get tenants at new ballpark*. This article highlights the issues facing the city of Miami after the city spent $120 million on four parking garages with street level retail space to go along with the new baseball stadium, Marlins Park. The city had hoped to make back some of the $120 million through an expected increase in sales tax income after shops would open up in the parking garages. Unfortunately, after constructing the new stadium, the Marlins sold off all of their best players and essentially ensured that the team would lose much more than they would win. Businesses that were in the process of opening new shops or at least considering opening establishments near the stadium, saw the fire sale of players and backed out of the area. Four years after approving the stadium, not a single business is operating in the spaces the city provided for retail activity (Rabin, 2013). The Wall Street Journal published *A stadium's legacy throws taxpayers for a loss* an in-depth look at the deal orchestrated in Hamilton County, Ohio to fund a new football stadium for the Cincinnati Bengals and a new baseball stadium for the Cincinnati Reds. This deal accounts for 16.4 percent of Hamilton County's budget. Hamilton County is unique in that they financed almost the entire cost of construction for both stadiums. Hamilton County enacted this harmful deal because the Bengals were threatening to move out of Cincinnati if a new stadium was not built (Albergotti and McWhirther, 2011). Even less established sports media such as deadspin.com have run numerous articles on sports stadiums such as articles titled *The Marlins Are So Bad, Businesses Don't Want To Open Nearby* and *The Public-Funding-For-Stadiums Hustle Comes To Spring Training* (Petchesky, 2013; Dickey, 2013). Both of these articles criticize the use of public subsidies for stadium construction with the end goal being positive economic development. Popular opinion is beginning to agree with the notion that sports

stadiums are not good tools of economic development. Even with the public becoming more educated on the scheme of public funding for stadiums, stadiums are still being built and still are using public funding.

"Rare is the local government that [says no] to the demands of its sports franchise" (deMause & Cagan, 2008, p. 62). Time and time again, the decision by cities is to build a new stadium for their franchise. St. Louis is feverishly putting together plans for a new publicly financed downtown, riverfront stadium to be built. Policy makers who determine that it is in the best interest of their city to keep a franchise by building a new stadium will trumpet the new stadium as sound economic development. In the majority of cases, but certainly not all cases, sports stadiums do not result in a positive or negative economic impact on the cities that house them, but instead provide little noticeable economic impact (Baade and Dye, 1990).

Chapter 2 - The Rise of Soccer in the United States.

No country in the world consumes sports on the level that the United States of America does with an estimated 85 percent of all Americans identifying themselves as sports fans (Bennett, 2013). Professional sports in the year 2013 were an estimated $422 Billion industry in the United States (Hoag, 2013). The United States has the highest level baseball (MLB), basketball (NBA), American football (NFL), and hockey (NHL) leagues in the world. These sports greatly influence the cultural lexicon and makeup of the United States. Some of our most iconic landmarks and beloved areas in the United States are centered around sports stadiums. For example, when thinking of Boston, MA some may think of Fenway Park, the home of the Boston Red Sox of Major League Baseball as an iconic landmark in Boston. Fenway Park is not alone in being particularly distinguishable to its city's identity. Across the major cities of the United States sports stadiums and arenas have become iconic to their city. For as popular and influential as these sports are in the US, the world's most popular sport, soccer, has traditionally been underrepresented in American sports culture.

History of Professional Soccer in the United States

The history of professional soccer in the United States has two defining periods. The first period started in 1968 when the North American Soccer League (NASL) became the first Division 1 professional soccer league in the United States. The NASL existed until 1985 when the league disbanded. The NASL experienced some notable popularity in the late 1970's as teams such as the New York Cosmos had an average attendance over 45,000 spectators between 1977 and 1980. Average game attendance among all teams during this time period was about 13,000 people (U.S. Soccer, 2013). The NASL's relative popularity ultimately led to its downfall

as over expansion, financial troubles stemming from the recession of the early 80's and an overreliance on foreign born players doomed the league. In particular, the NASL relied on bringing in aging foreign soccer stars to attempt to buoy the league. Because of this practice the stock of U.S. born soccer players was relatively low and the quality of play suffered. The NASL disbanded in 1985 and soccer appeared dead in the United States

The second period began in 1989 when the U.S. qualified for its first World Cup since 1950. In 1990 the U.S. team comprised mainly of amateur college players competed in the World Cup and soccer became more of an interest in the United States. This time, U.S. soccer was more organized and strategically planned to grow soccer in the U.S. The next big event occurred in 1994 when the U.S. hosted the World Cup. The 1994 World Cup increased soccer's profile in the United States considerably and led to the creation of Major League Soccer (MLS). As a stipulation for hosting the 1994 World Cup, U.S. Soccer had to create a professional league in the United States. In 1993 MLS was founded and in 1996 the first game took place. This set the framework for more a more sustainable growth of soccer in the United States (as compared to the short lived popularity of soccer in the late 1970's). The more sustainable growth of U.S. soccer is attributable to a more organized governing body (U.S. Soccer), a more financially responsible league in MLS, a greater commitment to developing U.S. born players and wider audience captured through broadcasting the World Cup. The stability of soccer created by more homegrown players and a better professional league allowed for the U.S. to build better national teams and to begin being more competitive in World Cups. World Cups have become must see television in the United States and when the U.S. national teams (both men's and women's teams) compete in the World Cups it becomes the culture event of the summer. Because of this, soccer has seen its popularity increase dramatically in the United States (U.S. Soccer, 2013).

According to a 2012 ESPN poll, between the ages of 12-24 soccer is the second most popular sport in America (Bennett, 2013). Major League soccer set a new attendance record in 2012 and has had a higher average attendance than both the NBA and NHL since 2011 (Gaines, 2011). Soccer has become the 5th major sport in the United States. Soccer is in demand and has a strong, loyal fan base. U.S. Soccer is a well-run, stable organization that is developing homegrown players and increasing the profile of soccer in the United States, especially at the youth level. Finally, MLS is stable. It is growing, in demand, and financially competitive. The demand for professional soccer should be treated similarly to the other major U.S. Sports.

Current State of Soccer in the United States

As soccer has grown in the United States, the demand for soccer specific stadiums has increased. Soccer is at an all-time high in popularity worldwide and in the United States. MLS is currently going through a rapid expansion process. As of March 24, 2015, Major League Soccer (MLS) has 20 franchises, with 17 franchises based in the United States and three based in Canada. Chiva USA is included in this study although the franchise has temporarily folded for the 2015 and 2016 seasons. In 2017, Los Angeles FC will effectively replace Chivas USA. Orlando City S.C. and New York F.C. began play in 2015, but are not observed in this study. In 2017 MLS will add a franchise in Atlanta and in 2018 Minnesota United FC will join the league. By 2018, MLS will have 23 franchises and it is heavily rumored that Miami will receive a MLS franchise within this year. MLS commissioner Don Garber has publicly stated the league aims to have at least 24 teams by 2020 and the likelihood that MLS will expand beyond 24 teams is high (Galarcep, 2013). In awarding expansion franchises, MLS looks for four basic characteristics of potential which included:

(1) A committed long-term owner or ownership group with substantial money.

(2) An approved plan to build a soccer-specific stadium where the team would control revenue streams such as parking and concessions.

(3) A healthy media market

(4) A strong soccer fan base (Hakala, 2011).

When combining both chapter 1 and chapter 2 a dilemma becomes apparent. Soccer is a major, in demand sport in the United States. Professional sports teams are a major, in demand commodity in the United States. It is reasonable to suggest that within the next 15 years, cities will begin to face the same decision about building a new soccer stadium to replace their current stadium as they face with other professional sports. The question becomes what is the economic impact of soccer stadiums and what are the characteristics necessary to create a positive economic impact?

Chapter 3 – Studying the Game

Soccer's relative youth in the United States acts as a hindrance to this study as the economic impact of soccer stadiums has not been studied in great detail in the United States. Soccer stadiums are a relatively new phenomenon in the United States with the first soccer specific stadium opened in Columbus, OH in 1999. Between 1999 and 2012 12 other soccer specific stadiums have been built in the United States. Relatively little has been done to study soccer stadiums as tools of economic development because soccer has only recently become relevant. The lack of economic studies on soccer stadiums is due primarily to the lack of observable time and observable stadiums. Because of this, the literature review for the economic impact of soccer stadiums was focused on economic studies of professional sports stadiums in the United States. Methods were derived from professional sports stadium economic studies and were applied to the study of the economic impact of soccer stadiums.

A number of different methods have been used to measure the economic impact of soccer stadiums. The two most common methods are the use of case studies or the use of a regression analysis to determine the economic impact of a professional sports stadium. The economic impact of sports stadiums has been studied throughout the past century with the majority of studies occurring after the mid-1980s. Studies looking at the economic impact of stadiums became popular in the late 1980's and throughout the 1990's as many cities faced the decision of tearing down their old, historic stadium and building a new stadium to appease an owner. The need to appease owners become common place in the 1990's as owners began to utilize the "stadium swindle" to their advantage. Neil deMause and Joanna Cagan's 2008 book *Field of Schemes: How the great stadium swindle turns public money into private profit* is perhaps the most popular and well-known text highlighting the many problems associated with publicly

funded sports stadiums. deMause and Cagan in their text introduced the concept of the “stadium swindle” where franchise owners use a series of progressively aggressive threats to get a city to build them a new stadium.

The first threat is to claim that the stadium the team is currently playing in is structurally and or financially obsolete. This technique generally is not successful and the public will usually call the owner’s bluff. The next move by owners is to threaten to move the team from its current city to a new city, with a new stadium, if the current city does not succumb to the owner’s needs. This threat usually succeeds in getting politicians on board with franchise owners and will begin the push for public vote to fund the construction of a new stadium. The final move, and the most successful move for owners, is to claim great economic benefits from the presence of a new sports stadium. It is in this final technique that politicians and owners alike sell the need for funding a new sports stadium. Owners cite privately commissioned pro-stadium studies that claim positive economic windfalls stemming from a new stadium. These studies will claim that new stadiums increase retail and commercial activity, draw in tourist dollars, and encourage new development or redevelopment near the stadium.

A new technique has been added to the catalogue of threats possessed by owners. Owners now will promise economic development through the creation of entertainment districts around stadiums. By creating entertainment districts near or around the stadium owners can point to tangible economic development. Often missed in this technique is that the owners typically receive money from the public not only to build a new stadium, but also receive free land, tax breaks, and development rights to build an entertainment district around the stadium. Research proves that this sounds too good to be true. deMause and Cagan point to numerous economic studies, many of which will be covered in this literature review, to highlight the lack of economic

impact coming from sports stadiums. Establishing that new stadiums usually do not mean increased economic development, deMause and Cagan raise the central theme of their book, why do cities keep paying for stadiums at the cost of other city expenses (schools, roads, parks) when stadiums usually have little to no economic impact? (deMause & Cagan, 2008).

deMause and Cagan, through the use of case studies, highlight the many ploys, schemes and techniques sports franchise owners use to receive public funding for sports stadiums. deMause and Cagan examine a number of American sports cities through case studies. They examine sports stadium history in each city and highlight the events that the cities went through to get a new stadium. Throughout the entire book, deMause and Cagan continually question the reasoning for such large subsidies for new stadiums and highlight the potential problem with publicly funded stadiums.

deMause and Cagan in *Field of Schemes* focus on the economic effect of sports stadiums because sports stadiums are generally sold on the promise of positive economic impact. The majority of sports stadium studies realize this and rightly focus on the economic impact of stadiums. This is because of the large price tag associated with sports stadiums and the reoccurring promises that sports stadiums will have a positive economic impact. Measuring economic impacts is not the same as conducting a holistic cost-benefit analysis for sports stadiums. Sports stadiums have non-economic impacts that when measured with economic impacts may give a more holistic cost-benefit analysis of a sports stadium. *Identifying the Real Costs and Benefits of Sports Facilities* examines the non-economic benefits of sports stadiums (Chapin, 2002). Chapin compares sports stadiums to other large civic amenities such as concert/performance halls and museums. Chapin notes that if one person can get past the notion that in paying to build a stadium, cities are helping billionaire owners, who pay millionaire

employees, then you can begin to see sports and stadiums in the light of music halls and major art museums. Chapin notes that people gain benefits from these amenities that cannot easily be measured economically. Chapin, through precedent studies looking at the impact of civic amenities, found that noneconomic impacts of sports stadiums can be measured using four criteria. The first criteria is social and physical impacts which is similar to the theory of consumption values and refers to the enjoyment provided by sports and sports facilities to citizens in a community. The second criterion is the impact on city image which examines the notion that cities can benefit from being a "major league city." However this impact may be insignificant as hard evidence seems to indicate that people and business do not rate the presence of major league sports as a key factor in moving to a new city. The third criterion is political impacts which refer to the political momentum a politician or politicians can receive from the construction of a new stadium. The fourth and final impact is development which refers to the physical redevelopment in the area immediately surrounding the new facility. Development can be either complementary development that takes advantage of crowds or proximate development that occurs because of a more general upturn in the fortunes of the district. The value of noneconomic impact is difficult to measure and although the benefits seem obvious, quantifying the noneconomic impacts remains difficult (Chapin, 2002). Chapin centers his argument for measuring the holistic impact of stadiums on the premise that on a case-by-case basis sports stadiums have impacts beyond the economy of the city that house the stadium. Taken on the surface, this argument seems legitimate as it is reasonable to assume that sports stadiums affect more than economics. However, because sports stadium financing is often sold on the single idea that a stadium will have great effect on the economics of a city, special attention should be given to the economic impact of a stadium. Simply, because sports stadiums are sold as tools of

positive economic development, then the economic impact of sports stadiums should be given special examination.

Another study concerned with public subsidies is *Financing Professional Sports Facilities* which explores the magnitude and the sources of public funding for professional sports facilities. *Financing Professional Sports Facilities* concludes that "sports may make a city happy, but they are unlikely to make a city rich" (Baade and Matheson, 2011, p. 18). Baade and Matheson create a comprehensive list of all cities that house one of the five major sports and list the degree in which each city has used public funding to subsidize a stadium. This study is unique in that it considers soccer to be the 5th major sport in the United States and it allows for an understanding of the amount of public financing involved with professional stadiums to be seen (Baade and Matheson, 2011).

Case studies, because they consist of a relatively small number of observations, allow for a more detailed examination of their study population. *Major League Winner* a 2010 study conducted by Rosentraub examines the cities of Indianapolis, San Diego, Los Angeles, Columbus, and Reading, PA. Each city is presented as a case study that examines the history of sports stadiums in the city, the process each city went through to fund the stadium construction and the impact of the new stadium on the city. Studying each city on a case by case basis allowed for a better understanding of the intricacies and unique characteristics that influenced the economic impact of the stadium. Rosentraub was able to discover unique characteristics of the stadiums that contributed to the success of each stadium. Rosentraub indicated economic success of each stadium by examining the change in the amount of taxes collected after the stadium was constructed, the amount of new construction after the stadium was built and the amount of private investment in the stadium (Rosentraub, 2010). *Major League Winners* featured a number

of ways to determine the economic impact of a stadium in each case study including using a "But For" analysis. "But For" analyses are particularly popular in reports that use the method of case studies to determine the economic impact of a stadium. "But For" analysis used in sports stadium studies generally test a statement similar to "but for a stadium, new economic development would not occur" and ask if economic development would not have occurred "But For" a stadium being built.

In his 2004 study *Sports Facilities as Urban Redevelopment Catalysts: Baltimore's Camden Yards and Cleveland's Gateway* Chapin uses a "But For" analysis to determine whether a change in development trends would have occurred without the presence of a new stadium or if the change happened because of the new stadium. Chapin found that Camden Yards did not lead to enough new development to be considered to have a positive economic impact. Chapin did find that the Gateway project in Cleveland had a positive economic impact on its project area and downtown Cleveland (Chapin, 2004). Similar to how Chapin conducted his study, Buckman and Mack in their 2012 study *The Impact of Urban Form on Downtown Stadium Redevelopment Projects: a comparative analysis of Phoenix and Denver* used a But For analysis to determine the economic impact of stadiums. Buckman and Mack used a But For analysis to determine if new development found around the Coors Field in Denver and Chase Field in Phoenix would have occurred without the stadium being constructed. Buckman and Mack found that Denver's Coors field had a positive economic impact. They found that within a year after Coors field was constructed an estimated $200 million worth of retail development was planned for the area. Within a year of construction, Buckman and Mack also found that 25 new restaurants had been added to the area and the number of housing units in the area doubled to 800 units. Conversely,

Buckman and Mack found that Phoenix's Chase Field had far less of an impact as there was less development that occurred after the stadium (Buckman and Mack, 2012).

Case studies provide a good way to understand what makes a stadium successful on an individual basis and provides a detailed glimpse at how stadiums effect the built and economic environment associated with a stadium. However, studies using the method of case studies contain a number of weaknesses. Case studies lack a sense of uniformity and the results from case studies are hard to apply to stadiums across the United States. This is because results from using case studies are highly individualized to the stadium they are focused on. With such a small observation stemming from case studies it becomes difficult to find trends applicable to all stadiums in the United States. In order to gain a broader understanding of the economic impact of sports stadiums, most studies use a regression analysis.

Regression analyses have a larger study population than case studies and are used to discover the relationship between a dependent variable and a set of independent variables. Sports stadium studies that use a regression analysis to determine the economic impact of a stadium will use the change in an economic indicator to determine the impact of the stadium. Economic indicators used in regression analyses include the change in personal income, employment or taxable sales before and after a stadium was built. Changes in economic indicators are used as the dependent variable in the regression analysis. Studies utilizing a regression analysis will look to see if the dependent variable is influenced by the presence of a number of independent variables that are hypothesized to have an effect on the economic impact of a stadium.

The 2008 study *Selling the Game: Estimating the Economic Impact of Professional Sports through Taxable Sales* conducted by Baade, et al. (2008) explores the relationship between sports stadiums and taxable sales. Baade, et al. (2008) warn cities of the dangers of

being persuaded by sports boosters who use highly "padded" studies to justify subsidizing stadiums. This study highlights the techniques that economic impact studies conducted by sports franchise and stadium proponents use. This study also estimates the impact of sports stadiums through taxable sales. Baade, et al. (2008) expose the *ex ante* economic impact study that stadium promoters use. *Ex ante* economic impact studies estimate a supposed direct economic impact by estimating the "number of visitors a team expects to draw, the number of days each visitor is expected to stay in the city, and the amount each visitor will spend" (Baade, et al. 2008, p. 796). *Ex ante* studies are prone to being influenced by personal bias because the three factors used to estimate total economic impact are also estimates. *Ex ante* studies suffer from other bias including 'crowding out' which is when citizens avoid going near the stadium during games thus reducing economic activity. 'Leakages' are another bias of ex ante studies. 'Leakages' happen when a dollar is spent within the city (at the stadium) and then re-spent outside of the city. This happens at a high occurrence with stadiums because money spent at stadiums goes to a relatively small number of people (athletes, owners) many of which do not live within the city.

Baade, et al. (2008) encourage *ex post* economic impact studies that view the impact of a stadium through empirical evidence over a period of time. *Selling the Game: Estimating the Economic Impact of Professional Sports through Taxable Sales* uses taxable sales data to determine the economic impact of stadiums in the state of Florida. They chose Florida because the state houses two franchises in each of the big four sports (football, baseball, basketball, and hockey). Baade, et al. (2008) conducted a regression analysis that used a reduced-form model that estimates the change in taxable sales for the Jacksonville, Orlando, Tampa Bay, and Miami MSAs. The reduced-form model controls for national economic factors and natural disasters such as hurricanes that can affect taxable sales. Baade, et al. (2008) reduced form model attempts

to find the impact of introduction of sports stadiums to an MSA and also looks at times when sports are not being played due to strikes to see if taxable sales decrease during this time. Ultimately, Baade et al. find that *ex post* studies show more negative correlation between taxable sales and stadium development than do *ex ante* studies (Baade, et al 2008).

Measuring taxable sales across a city gives a true understanding of the impact of a stadium. Taxable sales are a good to use in sports stadium studies because cities that build stadiums often expect to see an increase in commercial and retail activity. Taxable sales represent a measureable result of commercial and retail activity. However, replicating this method on a national scale is very difficult as different states collect sales tax at different rates. In studies limited in scope to a single state, such as the Baade, et al (2008) study, tracking the change in taxable sales maybe the most desirable way to measure the dependent variable in a regression analysis. For national studies measuring the dependent variable in taxable sales may not be feasible. This is because sales taxes vary greatly between states and achieving any semblance of uniformity amongst taxable sales across a number of states is very challenging.

Measuring the change in personal income as the dependent variable in a regression analysis is a popular measure of the economic impact of soccer stadium used in many sports stadium studies. Baade and Dye's 1990 study *The Impact of Stadiums and Professional Sports on Metropolitan Area Development* was one of the first sports stadium studies to use a regression analysis to test for the economic impact of sports stadiums. Baade and Dye (1990) looked at nine cities from 1965 to 1983 that housed a baseball or football stadium and conducted a regression analysis to discover the impact of sports stadiums on the personal income of the residents in the nine study cities. Baade and Dye found of the nine cities studied, eight cities have an uncertain economic impact and one possibly has a negative impact on local development. Baade and Dye

caution against cities assuming a positive economic impact from stadium development and assert that an uncertain impact or even a negative economic impact should be expected. Baade and Dye criticize the assumptive nature of indirect benefits that stadium proponents use as justification for subsidizing stadiums. Claimed indirect benefits of stadiums are sales outside of the stadium that are a result of stadium events and the subsequent multiplication or the re-spending of that new income in the city. The biggest problem with sales outside of the stadium as a direct result of stadium events is whether the sale is a new activity that creates a net sales increase in the city, or if the sale is a reallocation of money that could be spent elsewhere. For example, if a family spends $50 at a baseball game, that is $50 a family could be spending at a movie theater. The family only has $50 to spend and has chosen to spend money on one activity over another. Multipliers range in size. If a family spends $50 on a movie theater ticket, it is more likely that income will be spent in the city than if a family spends $50 on a sports ticket. This is because money spent at a movie theater goes to people who live locally and thus spend locally. Money spent at a stadium goes to owners and athletes, many of who do not live locally or do not spend locally. Baade and Dye attack indirect benefits as not having significant impact on income and thus should not be used in empirical examination (Baade and Dye, 1990).

A more recent study that uses a regression analysis to determine the economic impact of professional sports stadiums is Coates and Humphreys' 2000 study *The Stadium Gambit and Local Economic Development*. Coates and Humphreys examined 37 cities and used two models to understand the economic impact of sports stadiums. The first model Coates and Humphrey employ is a reduced form model that considers all 37 cities that host sports stadiums and develops an estimate of real per capita income. The reduced form model controls for a number of city specific factors that could have an effect on real per capita income. The second model that

Coates and Humphrey use is a regression analysis that regresses the level of income of each sports city on the average income level of all United States cities and finds if there is a difference in income between sports and non-sports cities. Coates and Humphreys find that sports stadiums result in an insignificant or negative economic impact (Coates and Humphrey, 2000). Both *The Impact of Stadiums and Professional Sports on Metropolitan Area Development* and *The Stadium Gambit and Local Economic Development* found that stadiums have little impact on personal income. Both studies also note the problem associated with multipliers. Multipliers are often used by stadium proponents to show the overall impact of the sports stadium. The problem with multipliers is that they are easily influenced by personal bias. Multipliers when used in studies are often determined by the study conductors. This means that the potential for personal bias to affect the multiplier is high (Coates and Humphrey, 2000; Baade and Dye, 1990).

The previous two studies both used a regression analysis to discover the impact of sports stadiums on personal income and found that sports stadiums generally do not have a positive impact on personal income. Regression analysis are predictive and are intended to be used to predict future outcomes based on past results. This is to say, not all regression analysis looking at the effect of sports stadiums on personal income find an insignificant or negative effect. *Economic Impact of Sports Stadiums: Recasting the Analysis in Context* by Charles Santo is a study that performs a similar regression analysis as seen in previous examples but highlights two limitations of previous studies. First, Santo argues that the time period limits many studies. Studies conducted in the 1990's have looked at stadiums built in the 1960's through the early 1980's. Many of these stadiums were multi-use stadiums that were built on the exurbs of cities and not in the context of the city. These stadiums are surrounded by surface parking lots that function much like a moat. Santo points to a shift in stadium design to single use stadiums that

are located closer to the central business district of their respective cities and are more aligned to the pedestrian scale.

Santo secondly argues that context matters in studying stadiums and finds that of the nineteen MSA's stadiums built between 1984 and 2001, eight of those stadiums had a positive economic impact. Santo calls these new stadiums, "current generation stadiums" and Santo uses a cross-section time-series analysis to compare the nineteen different cities that built or renovated a stadium between 1984 and 2001. This study excludes older facilities that are not similar to newer generation facilities in order to avoid clouding data on current generation stadiums. Santo uses the exact same formula that Baade Dye (1990) used in *The Impact of Stadiums and Professional Sports on Metropolitan Area Development* which studied the relationship between MSA personal income and the presence of a stadium but with more current data. Santo finds that eight current generation stadiums have a positive impact on personal income (Santo, 2005). The change in personal income as an indicator of the economic impact stadium is not the only way of measuring the economic impact of a stadium.

Another common way of measuring economic impact of sports stadiums is through examining the impact of sports stadiums on job creation. Similar to studies looking at the relationship between personal income and sports stadiums the preferred method of measuring the impact of sports stadiums on job growth is through the use of a regression analysis. Baade and Sanderson in their 1997 study *The Employment Effect of Teams and Sports Facilities* measure the impact of sports stadiums on job growth beyond what is normally expected from an alternative use of the public funds going to a specific stadium. Baade and Sanderson note that a disconnect exists between the way stadium proponents measure jobs created by a stadium and how economist traditionally measure jobs created by subsidies. Stadium boosters, when

measuring the impact of stadiums on jobs will use the gross total jobs created, while economist studying subsidies use the net total jobs created. Baade and Sanderson emphasize the disparity between gross and net impact by highlighting the impact of the Kingdome in Seattle on employment. The gross estimate for jobs created by the Kingdom was 2,249 jobs while the net increase was only 427 jobs. This discrepancy highlights the gulf between stadium proponents' estimates and actual realized impacts. Baade and Sanderson used a multivariate regression analysis to measure job growth in the sectors of amusement and recreation before and after stadium construction in 10 cities. Baade and Sanderson find that in general there is no correlation between professional sports and job creation. They furthermore note the jobs that are created are overwhelmingly low-paying jobs. Low paying jobs, coupled with the fact that the majority of franchises recover all in stadium sales and profits, means that little money is directly generated from a stadium. Baade and Sanderson discover that stadiums do not create a demand for labor, noting that "demand for labor derives from the demand for goods and services" (Baade and Sanderson, 1997, p. 93). Baade and Sanderson note that spending on spectator sports is largely offset by reductions in other forms of leisure spending. This offset is commonly referred to as the substitution effect. Because citizens substitute spending on sports for other activites it is reasonable to assume that professional sports have little to no correlation with an increase in new spending. Without an increase in new spending, demand for new jobs will not be created (Baade and Sanderson, 1997).

Coates and Humphreys in their 2001 study *The Effect of Professional Sports on Earnings and Employment in the Services and Retail Sectors in U.S. Cities* examine the economic impact of the substitution effect of sports stadiums through the lens of change in employment and earnings in employment sectors. Coates and Humphreys find that stadiums have a positive effect

on the employment sector of Amusements and Recreation and an offsetting negative effect on the employment sectors of eating and drinking establishments and hotels and other lodging. These employment sectors were chosen because stadium proponents claim an increase in earnings and employment in these sectors. Coates and Humphreys use a linear reduced form model to determine both wages and employment in service and retail divisions and to determine wages for the major groups of hotels, amusements, and eating and drinking places. The end result of the study was seven regressions for each of the 37 professional sports SMSAs. Coates and Humphrey use their analysis to question the validity of multipliers as a way for determining impact of a stadium. In particular, they note that it is incorrect to assume that "each dollar of direct spending on sports propagates through the economy and increases spending and income in other sectors" (Coates & Humphreys, 2004, p. 16). The biggest impact of sports determined by Coates & Humphrey is the negative effect on earnings in the restaurants and bars sector and the negative impact on employment in retail and services. The slight increase in the sector of amusement and recreation diverts money away from retail and service sectors and restaurants and bars sector. As Baade and Sanderson noted in their 1997 study *The Employment Effect of Teams and Sports Facilities* jobs created by sports stadiums are generally low paying. The slight increase in amusement and recreation employment has two results. First it creates a slight increase in low paying jobs and secondly it diverts spending away from higher earning jobs found in the retail and service sectors and restaurants and bars sector (Coates and Humphreys, 2004). The most common econometrics used in sport stadium studies that employ a regression analysis is either the change in personal income or the change in employment. Both of these metrics are excepted indicators of economic strength.

Like any empirical analysis, the more in depth and detailed one can be with their research, the better and fairer the results will be. This logic applies to studies examining stadiums as tools of economic development. As previous literature has indicated, in most cases stadiums do not provide a positive economic impact to the cities that subsidize them. Even in cases where researchers either expanded the criteria used to evaluate economic impact or looked at a more local level, success rate of stadiums is still low. This does not mean that all stadiums are economic disasters.

The literature review consisted of two goals. The first goal of the literature review was to gain an understanding of the overall economic impact of sports stadiums. The second goal of the literature review was to understand the best way to measure the economic impact of professional sports stadiums. In answering goal one, the literature review found that in most studies little to no economic impact can be expected as a result of building a stadium. In answering goal two, the literature review found that when trying to gain an understanding of how sports stadiums impact the economy of the city that houses them it is best to use a regression analysis to understand this impact. Regression analyses are especially useful in stadium studies because they consider all stadiums in the country and produce an all-encompassing result that is applicable to stadium projects throughout the United States. Using the literature review to determine the method for this study was rather straight forward as a regression analysis allows for a national study to be conducted. Determining the econometric for the regression analysis proved to be more difficult. The literature review highlighted a number of econometrics to use when measuring the economic impact of a stadium. Measuring taxable sales makes sense on a state level but does not translate to a national level. Measuring change in personal income is relatively straight forward in its logic, but attributing the change in personal income across an entire city solely to a sports

stadium makes a large number of assumptions. Adopting and adjusting the econometric of measuring the change in employment allows for the best econometric to be used in the study. As previous studies have executed, targeting employment in industries related to sports stadiums is particularly useful. This study will also track change in the number of establishments and total wages in industries related to sports stadiums. By adding the change in establishments and wages, two additional multiple regression models will be run and there will be three dependent variables examined in this study. By testing three separate dependent variables, a more complete understanding of the relationship between a soccer stadium and the successful sports stadium characteristics found at the stadium can be had. This study will track the change in employment, establishments and wages in the industries of food and accommodation services, art, entertainment, and recreation, and retail trade. Similar in spirit to tracking taxable sales, tracking the change in these industries allows for concise targeting of economic development that is expected as a result of building a stadium. The literature review establishes a regression analysis measuring the percent change in the sum of establishments, employment, and total wages before and after a stadium was constructed in the industries of food and accommodation services, art, entertainment, and recreation, and retail trade as the best method to measuring the economic impact of sports stadiums. Following this section, the methods used in this study will be explained. The first step to the methodology is to find the independent variables that are hypothesized to have a positive effect on the economic impact of the stadium. A best practice analysis will be used to determine the independent variables, or successful sports stadium characteristics, that make stadiums economically successful.

Best Practice Analysis

The best practice analysis is an exhaustive process that discovered three characteristics of sports stadiums that make stadiums economically successful. Similar to the literature review in execution, the best practice analysis reviewed past literature that focused on sports stadiums with positive economic impacts. Through reviewing past literature that highlights successful sports stadiums, three characteristics emerge. The three characteristics seen in economically successful sports stadiums are as follows:

1. The stadium is located in or directly adjacent to the Central Business District.
2. The stadium is serviced by public transportation including light rail, subway, streetcar, and bus rapid transit (BRT). This does not include regular, fixed route bus transportation.
3. The stadium is a part of the fabric of the city. The stadium must be integrated into the city and work as a part of the fabric of the city. The stadium cannot be surrounded by surface parking lots.

Stadium is located in or directly adjacent to the Central Business District

According to Rosentraub, “Indianapolis wrote the textbook on using sports and cultural facilities to revitalize its downtown area.” It is hard to disagree with this statement. Indianapolis in the 1970’s faced many of the problems that large, Midwestern cities faced in the 1970’s, mainly urban flight, deteriorating infrastructure and loss of identity in the Central Business District. Indianapolis looked to sports stadiums as a way to rebuild their downtown. In total from 1974 to 2008 Indianapolis invested approximately $8.3 billion, including just over $2.5 billion in public investment. This substantial investment resulted in transforming Indianapolis from a city

nicknamed “Indiana-No-Place” to a city that routinely hosts NCAA Final Fours, Super Bowls, and large conventions. Indianapolis built Conseco Fieldhouse in 1999 (now Bankers Life Fieldhouse) to be the new arena for the Indiana Pacers and in 2008 built Lucas Oil Field, a dome stadium, home to the Indianapolis Colts (the Colts formerly played in the RCA dome which was also located in downtown). Both stadiums are located in the heart of downtown Indianapolis. Indianapolis residents take great pride in their professional sports and downtown and rate the area as one of the most important cultural assets in Central Indiana. In 2006 a reported 17.1 million visitors attended events or attractions in the downtown area. The high success of the sports based downtown development spurred private investment in the arts and real estate development. Indianapolis was successful in capturing the momentum from its investments in stadiums and parlaying that momentum into private investment. For every $1 of public funding committed in downtown Indianapolis, an additional $2.30 in private investment was committed. By placing stadiums directly in the heart of downtown, Indianapolis was able to create an attractive place for new investment and was able to garner a successful economic impact from their sports stadiums (Rosentraub, 2010).

Indianapolis, along with San Diego, Los Angeles, and Columbus, OH has been successful in using sport stadiums to spur economic development. Common amongst each of these cities was locating their respective stadiums downtown. By locating their stadiums in the Central Business District, these cities were able to fit their stadiums in concentrated, amenity rich areas. Rosentraub, in his 2010 text *Major League Winners*, notes that economically successful sports stadiums succeed by linking sports, culture, and entertainment. These cities were able to integrate stadiums with museums, libraries, performance art venues, and retail and commercial districts. By concentrating sports stadium development in a specific and defined area, successful

cities are able to target redevelopment funding and initiatives to a set area. In targeting an area for redevelopment cities can better ensure completion of a project. Central Business Districts are one of the few locations in cities that have the critical mass to support sports, cultural and entertainment amenities. As Rosentraub notes “dispersing amenities risks the impression that each is an isolated island of activity in a large sea of deteriorating properties” (Roesntraub, 2010). Concentration of amenities creates crowding which in turn fosters a safe and thriving image. Indianapolis (Lucas Oil Field and Bankers Life Fieldhouse) and Los Angeles (Staples Center and accompanying L.A. LIVE district) were especially successful at creating areas that the general populous now feels are safe and thriving. In both instances, Los Angeles and Indianapolis combined sports, culture and entertainment to create a vibrant, eclectic experience that spurred private sector redevelopment activities (Rosentraub, 2010).

Stadium is serviced by public transportation

Wrigley Field is an iconic baseball stadium located on the Northside of Chicago, IL. Although Wrigley Field was constructed in 1914, it serves as the gold standard in stadiums engaging neighborhoods. Affectionately known as “Wrigleyville” the neighborhood surrounding Wrigley Field comes alive during home games. Even though Wrigley Field is home to the notoriously awful Chicago Cubs, fans fill the stadium during games and the local restaurants and bars surrounding the stadium before and after games. Wrigley field has a seating capacity of 41,009 which makes it the 10th smallest baseball stadium by capacity (Oakland A’s are the smallest at 35,067 and the LA Dodgers are the largest at 56,000) and it has a relatively small building footprint. This means that there is a lack of room for concession stands within the stadium, leaving people more apt to spend money that would go to concessions inside the stadium, outside of the stadium. It is difficult to park at Wrigley Field due to the complete lack of

surface parking. This means fans must use public transportation or park in the surrounding neighborhoods in order to watch a game at Wrigley Field. The lack of surface parking at Wrigley is most likely derived from Wrigley being built before the automobile became the preferred mode of transportation. Because surface parking is not provided around the stadium, convenient public transportation is needed. Wrigley features a subway stop less than .05 miles from the stadium. Having public transportation near a stadium increases the walkability of the area surrounding a stadium. Surface parking lots make for uncomfortable and uninteresting environments for pedestrians. If a stadium has access to good public transportation, the need for surface parking is reduced. This reduction allows for better pedestrian connectivity throughout the neighborhood the stadium is located in. More people walking along streets in the neighborhood, the more active a neighborhood can be. The many bars and restaurants in the Wrigleyville neighborhood benefit from the pedestrian street activity that is made possible by good public transportation (Baade, Matheson, Nikolova 2009, p.50)

A new trend in sports stadium development is to build stadiums as a part of a larger entertainment district. The motivation behind entertainment districts is that large crowds associated with an event being held in a stadium will spend time and money before and after the game in the entertainment district (deMause & Cagan, 2008). Entertainment district are typically populated with bars, restaurants, and shops. Entertainment districts hope to create a festival like atmosphere. Planning for public transportation within the entertainment district will allow for a festival like atmosphere to occur within the entertainment district while also providing a safe way home for fans.

Stadium is a part of the fabric of the city.

The idea of fitting a stadium to the fabric of a neighborhood started with the construction of Baltimore's Camden Yards. Opened in 1989, Camden Yards was the first stadium to embrace the "retro" feel that had been abandoned in stadium designs of the 1970's and 1980's. Stadiums built in the 1970's and 1980's were primarily designed as concrete, multi-purpose bowl stadiums that were not overly aesthetically pleasing. Stadium design of the 1970's and 1980's aimed to fit the most sports, the most fans, and the most cars in and around a stadium. Camden Yards was the first professional sports stadium to break away from this mold. The total economic success of Camden Yards is still debated, but the impact that Camden Yards had on building stadiums as a part of the fabric of a city is noticeable. After Camden Yards was built, a study commissioned by the city of Baltimore found that number of people coming from outside the Baltimore region nearly doubled (deMause & Cagan, 2008). Fans were attracted to Camden Yards because of its retro feel. The retro feel of Camden Yards refers to both the architectural features of the stadium and the fit of the stadium into the neighborhood. Camden Yards features a large brick warehouse along the right field stands that serves as picturesque backdrop for ballpark (Langdon, 2009, 152). Camden Yards won numerous accolades for its design and the success of the stadium brought light to the need to build stadiums into the fabric of the neighborhood they occupy.

Coors Field in Denver, CO has, by most accounts, been a giant success. Coors Field has acted as a catalyst for the LoDo area of Denver, CO. Opened in 1995, Coors Field was built into the context of the city and designed by HOK Sport to take "cues from the materials and styles of structures nearby" (Langdon, 2009, p. 152). The stadium created interest among people living in the Denver metro area and upon visiting the stadium, people found the area to be surprisingly walkable and safe. Coors Field does not have designated surface parking and is located near

public transportation. Six years after Coors Field opened, 600 lofts, apartments and condominium units were developed in a warehouse area next to the stadium and numerous bars and restaurants were established (Langdon, 2009, p. 152). Research also showed an increase personal income in this area (Santo, 2005; Koehler, 2012). Buckman and Mack attribute the success of Coors Field to the urban form of Denver and in particular the LoDo area of Denver. LoDo is the historic warehouse district of Denver. Coors Field is successful because it is integrated into the fabric of the downtown and was designed to share many of the characteristics older neighborhood style baseball stadiums.

CenturyLink Field, Seattle, WA is the home of the NFL's Seattle Seahawks and home to the MLS's Seattle Sounders. CenturyLink Field completed construction in 2002 and has a seating capacity of 67,000 people and included all the suites and amenities seen in most modern day stadiums. Seattle went through extraordinary measures to ensure that the stadium would fit the neighborhood and community. Design guidelines were created to ensure that the stadium meets the context of the surrounding neighborhood. Most of the buildings surrounding the stadium were built with the same construction elements and are 85 feet tall. The stadium is designed with an 85 foot high masonry base that mimics the surrounding buildings. This helps to fit the large stadium to the pedestrian scale (Young, 2009) and allows for the stadium to be connected to a neighborhood.

With the three successful sports stadium characteristics established, the multiple regression models can be formed. The multiple regression models tests to see the relationship between the three successful characteristics discovered in the best practice analysis with the realized economic impact of the 16 soccer stadiums. The multiple regression models will be detailed next in Chapter 4.

Chapter 4 – Game Plan

This study will not answer the question of whether it is right or wrong for cities to finance the construction of soccer specific stadiums. The majority of circumstances where a city decides between building a new stadium or not, the city will ultimately be persuaded to build a new stadium. This report will examine the characteristics of stadiums that are reported to have a positive economic impact on the cities that house them and will compare those characteristics to soccer stadiums in the United States. Cities use public funding to build soccer specific stadiums. This study attempts to test the attributes associated with public benefits based on current stadiums in order to protect the public investment in future soccer specific stadiums.

There are two parts to this study; first, understanding the characteristics of economically successful sports stadiums and the second, examining economic impact of soccer specific stadiums. Multiple parts to the study means there are multiple boundaries both physically and theoretically. Attributes associated with public benefits of stadiums are derived from a study of NHL, MLB, NBA and NFL stadiums and were addressed in the best practice analysis found in Chapter 3. When examining the current economic impact of soccer stadiums, the study is bound to stadiums that house Major League Soccer franchises. The study is bound to the United States of America. No stadiums from any other country, this includes Canada, are included in this study. Bounding the study to the United States makes data gathering easier and controls for different national contexts. Soccer is the major sport most likely to expand in the United States; therefore keeping the boundary to the United States makes this report more relevant.

The study analyzes the 16 cities that house an MLS franchise in the United States. Chivas U.S.A. is included as an observation in this study even though Chivas will not play in 2015 and 2016. In 2017 Chivas U.S.A will be reintroduced to MLS as Los Angeles F.C. Because of this

Chivas U.S.A is included in this analysis. Currently there are 20 teams that compete in Major League Soccer and of those 20 teams, 17 play in the United States (these figures include New York F.C. and Orlando City S.C. two expansion franchises that began play in 2015 and are not observed in this study). Twelve MLS franchises play in soccer specific stadiums and five franchises play in multipurpose stadiums that host both soccer along with another professional sport. Adding Chivas USA to this study means there will be 16 cities studied and 13 soccer specific stadiums studies. All 13 soccer specific stadiums were built between 1999 and 2012. The five non-soccer specific stadiums were built between 1961 and 2002. Of the five non-soccer specific stadiums, only three are used in this study. San Jose Earthquakes moved out of Buck Shaw Stadium and into Avaya Stadium, their new soccer specific stadium, in spring 2015. This study observes San Jose Earthquakes time in Buck Shaw Stadium.

I constructed two primary regression models. The first includes the 13 cities with soccer specific stadiums and an additional 13 similar cities. This model contains a stadium variable to test whether the construction of the soccer specific stadium itself was related to economic performance. The second model includes only the 16 soccer cities. The second model tests the relationship between successful sports stadium characteristics and economic performance. The characteristics that make a stadium economically successful have been determined through the best practice analysis found in Chapter 3. The study population for both regression models will be explained first. Next the formulas used for both primary regression models will be provided. Finally, the reasoning behind the dependent and independent variables will be explained.

Study Population

The study population can be seen in table 4.1 and provides the location, year built, capacity and 2013 average attendance for each soccer stadiums in the United States. The average 2013 per game attendance for all stadiums in this study was 18,487. The average stadium capacity for all stadiums in this study is 21,239. Seattle Sounders, which shares CenturyLink Field with the Seattle Seahawks, plays in the largest capacity stadium at 38,300. The smallest capacity stadium is San Jose's Buck Shaw Stadium at 10,525. The regression analysis considers each of the 16 cities displayed in table 4.1.

Table 4.1 16 soccer cities and general stadium information.

City	Team	Stadium	Year Opened*	Capacity*	2013 Attendance *
Columbus, OH	Columbus Crew	Crew Stadium	1999	22,555	16,080
Carson, CA	LA Galaxy	StubHub Center	2003	27,000	22,421
Carson, CA	Chivas USA	StubHub Center	2005	18,000	8,381
Frisco, TX	FC Dallas	Toyota Stadium	2005	20,500	15,373
Bridgeview, IL	Chicago Fire	Toyota Park	2006	20,000	15,228
Commerce City, CO	Colorado Rapids	Dick Sporting Goods Park	2007	18,086	15,439
Santa Clara, CA	San Jose Earthquakes	Buck Shaw Stadium	2008	10,525	12,765
Sandy, UT	Real Salt Lake	Rio Tinto Stadium	2008	20,000	19,594
Chester, PA	Philadelphia Union	PPL Park	2010	18,500	17,867
Harrison, NJ	New York Red Bulls	Red Bull Arena	2010	25,000	19,616
Portland, OR	Portland Timbers	JELD-WEN Field	2011	19,000	20,674
Kansas City, KS	Sporting Kansas City	Sporting Park	2011	18,467	19,902
Houston, TX	Houston Dynamo	BBVA Compass Stadium	2012	22,039	19,923
Washington D.C.	D.C. United	RFK Stadium	1996	19,467	13,646
Foxborough, MA	New England Revolution	Gillette Stadium	2002	22,385	14,844
Seattle, WA	Seattle Sounders	CenturyLink Field	2009	38,300	44,038

*ESPN. (2013). *Major league soccer stats: Team attendance 2013.*

The first model includes only those cities with soccer specific stadiums along with the 13 comparable cities and can be seen in table 4.2. For each of the 13 cities housing a soccer specific stadium, a comparable city was found. In order for a city to be comparable, the city must be similar to the soccer specific city in the following categories.

1. The MSA population (in the year 2010) is similar in size.
2. The city population (in the year 2010) is similar in size.
3. The number of professional sports stadiums (excluding the soccer stadium) is the exact same.
4. If the soccer city is the central city of an MSA the similar city will also be the central city of its MSA. If the soccer city is not the central city of its MSA than the comparable city will be distanced roughly the same distance from the CBD as the soccer city.

Table 4.2 Soccer cities and comparable cities for stadium presence. Cities to be compared located in same colored row.

City	2010 MSA population *	2010 Population *	Stadiums (Minus soccer stadium)	Distance to CBD (miles) **
Portland, OR	2,314,554	583,776	1	0.0
Sacramento, CA	2,215,770	466,488	1	0.0
Santa Clara, CA	1,919,641	116,468	0	3.7
San Mateo, CA	4,335,391	97,207	0	18.5
Carson, CA (Galaxy)	13,131,431	91,714	0	17.0
Westminster, CA	13,131,431	89,701	0	33.0
Carson, CA (Chivas)	13,131,431	91,714	0	17.0
Westminster, CA	13,131,431	91,714	0	33.0
Sandy, UT	1,140,483	87,461	0	13.5
Edmund, OK	1,252,987	47,472	0	13.9
Commerce City, CO	2,697,476	45,913	0	8.5
Wheat Ridge, CO	2,697,476	30,166	0	5.7
Kansas City, KS	2,054,473	145,786	0	22.3
Olathe, KS	2,054,473	125,872	0	15.3
Frisco, TX	6,810,913	116,989	0	27.9
Denton, TX	6,810,913	113,383	0	39.8
Houston, TX	6,313,158	2,099,451	3	0.0
Atlanta, GA	5,522,942	420,003	3	0.0
Bridgeview, IL	9,537,289	16,446	0	14.7
Miami Springs, FL	5,564,635	14,316	0	9.7
Columbus, OH	1,967,066	787,033	2^	0.0
Austin, TX	1,883,051	790,390	2^	0.0
Harrison, NJ	19,949,502	13,620	0	13.1
North Arlington, NJ	19,949,502	15,392	0	12.2
Chester, PA	6,034,678	33,972	0	21.0
West Chester, PA	6,034,678	18,461	0	24.0

* *Population Estimates* (2015). U.S. Department of Commerce. Published by United States Census Bureau

**Google Earth, 2014.

^Columbus, OH is home to Ohio State University which features large, well-attended sports facilities. Austin is home to the University of Texas which features similarly impactful college sports stadiums.

Models

Two multiple regression models were used in this study. Both models employ the same three different dependent variables; Percent change in the sum of establishments minus percent

change in national GDP, percent change in the sum of employment minus percent change in national GPD, and percent change in the sum of wages minus percent change in national GDP. Percent change in the sum of establishments, employment, or wages is derived from the industries of food and accommodation services, art, entertainment, and recreation and retail trade. The first regression model is titled stadium presence and it tests to see if soccer specific stadiums have any effect on economic performance. The second regression model is titled stadium characteristics and it tests the relationship between the economic performance of soccer stadiums and the presence of successful sports stadium characteristics.

Stadium Presence

The first regression model is the Stadium presence and it was used to determine if soccer specific stadiums have any effect on local economic performance. Stadium presence consists of three different dependent variables; percent change in the sum of establishments minus percent change in national GDP, percent change in the sum of employment minus percent change in national GPD, and percent change in the sum of wages minus percent change in national GDP. Percent change in the sum of establishments, employment, or wages is derived from the industries of food and accommodation services, art, entertainment, and recreation and retail trade. Each dependent variable was recorded for the 13 cities with soccer specific stadiums and the 13 similar cities. With three different dependent variables being included in the stadium presence, three separate models were run. The independent variables for Stadium presence remain constant across all three models.

A stadium variable has been assigned to the cities with soccer specific stadiums. Stadium presence tested to find the relationship between economic performance, measured in the dependent variables, and the presence of a soccer specific stadium. Other independent variables

included in the stadium presence are the change in city population, change in per capita income, change in local employment (change in local employment in the industries of manufacturing, finance and insurance services, and professional and scientific services). The formula used for stadium presence can be seen below.

Stadium Presence

$$Yi = b0 + b1(POP) + b2(INC) + b3(EMP) + b4(DUM)$$

Where;

Yi = The percent change in the sum in establishments, employment or wages minus percent change in GDP in the industries of food and accommodation services, art, entertainment, and recreation and retail trade before and after stadium construction.

(POP) = The change in population before and after stadium construction.

(INC) = The change in per capita income before and after stadium construction.

(EMP) = The change in local employment before and after stadium construction.

(DUM) = Stadium variable. Assigned to cities that house a soccer specific stadium.

Stadium Characteristics

After determining the relationship between soccer stadiums and economic performance the second set of regression models, stadium characteristics, was run. Stadium characteristics consists of three different dependent variables; percent change in the sum of establishments minus percent change in national GDP, percent change in the sum of employment minus percent change in national GPD, and percent change in the sum of wages minus percent change in national GDP. Percent change in the sum of establishments, employment or wages was derived from the industries of food and accommodation services, art, entertainment, and recreation and retail trade. Each dependent variable was recorded for the 16 cities with soccer stadiums. With three different dependent variables being included in stadium characteristics, three separate models were run. The results of the three separate models were interpreted as one result. The independent variables for stadium characteristics remain constant across all three models.

Stadium characteristics utilizes four independent variables. All four independent variables remain constant across the three separate models run within stadium characteristics. To control for local economic trends, the change in per capita income is included in the models. The other three independent variables are derived from the best practice analysis. The best practice analysis found that successful stadiums generally share the following three characteristics. First, the stadium is located in or directly adjacent to the Central Business District. Second, the stadium is serviced by public transportation including light rail, subway, streetcar, and bus rapid transit. This does not include regular, fixed route bus transportation. Finally, the stadium is integrated into the city as a part of the fabric of the city. The formula used for stadium characteristics can be seen below.

Stadium Characteristics

$$Yi = b0 + b1(INC) + b2(CBD) + b3(TRAN) + b4(SPRK)$$

Where;

Yi = The percent change in establishments, employment, or wages minus percent change in GDP in the industries of food and accommodation services, art, entertainment, and recreation and retail trade before and after stadium construction.

(INC) = The change in per capita income before and after stadium construction.

(CBD) = The distance in network miles between stadium and CBD.

(TRAN) = The distance in network miles from the stadium to public transit station.

(SPRK) = Amount of surface parking in square acres surrounding the stadium.

Variables Explained

Two multiple regression models were employed in this study. The first model, stadium presence, tested the relationship between soccer stadiums and economic performance. The second model, stadium characteristics, tested the relationship between the economic impact of soccer stadiums and the presence of successful sports stadium characteristics. Both multiple

regression models utilized three dependent variables; the percent change in the sum of establishments, employment and total wages before and after a stadium was built in the industries of food and accommodation services, art, entertainment, and recreation and retail trade minus the percent change in national GDP over the same time period. Independent variables included in stadium presence where the change in population, change in per capita income, the change in local employment, and a stadium indicator variable. Stadium characteristics included the independent variables of the change in per capita income, the distance of the stadium to the CBD in network miles, the distance in network miles to public transit from the stadium and the amount of surface parking in square acres surrounding the stadium. The reasoning behind the dependent variables used in both regression models will be provided first. Next, the logic behind the independent variables in stadium characteristics will be provided. The reasoning for the independent variables used in stadium presence will be provided. Finally, the reasoning behind the independent variables in stadium characteristics will be addressed.

Dependent Variable

The dependent variables used in both regression models are the percent change in the sum of establishments, employment and total wages before and after a stadium was built in the industries of food and accommodation services, art, entertainment, and recreation and retail trade minus the percent change in national GDP over the same time period. The dependent variables used in stadium presence can be seen in table 4.3. The dependent variables used in stadium characteristics can be seen in table 4.4.The dependent variables provide a way to measure the change in commercial and retail activity before and after a stadium. This study does not examine any subgroup of the aforementioned industries, but rather views the industries at their base, two digit naics code level. This is because politicians and stadium proponents often claim that

stadiums have a positive economic impact on most commercial and retail industries and keeping the focus of the study at the two digit naics code level allows for more breadth in the analysis. Data was collected at the county level in order to achieve a level of homogeneity in the data and to avoid potential problems caused by data suppression. All data used for the dependent variable was collected from the Quarterly Census of Employment and Wages (QCEW).

Percent change in the dependent variables are derived from the difference in the percent change in the sum of establishments, employment and total wages minus the percent change in national GDP before and after a stadium was built. Before a stadium was built refers to a full year before the stadium was built. After a stadium was built refers to a full year after the stadium was opened. If a stadium were opened in a city in November 2002, then the percent change in establishments, employment, or wages is measured by finding the difference between the realized establishments, employment, or wages from January 2001 to December 2001 and the realized establishments, employment, or wages from January 2003 to December 2003. This allows for a full years sample before and after the stadium was opened to be realized. This time structure used to represent change is replicated throughout the study. The same concept of change is used in determining when the change happens in percent change in national GDP. For a stadium built in November 2002, the percent change in national GDP from the year 2001 and 2003 will be used.

Percent change in establishments, employment, and total wages in the industries of food and accommodation services, art, entertainment, and recreation and retail trade was included in this analysis because they provide a way to measure the change in commercial and retail activity before and after a stadium. Past studies tend to focus on just one of these metrics. By focusing on three metrics, a better chance at discovering the relationship between soccer stadiums and

successful sports stadium characteristics can be had. The literature review showed that just measuring an increase in employment may miss the fact that the increase in employment came in low paying, low impact jobs. Baade and Sanderson in their 1997 study *The Employment Effect of Teams and Sports Facilities* noted that although jobs increased because of sports stadiums, the type of jobs were low paying and had little impact on the economy. This study recognizes this dilemma and includes establishments and total wages (measured in current dollars) as dependent variables in order to better understand stadium economic impact. Using this same logic, the industries of food and accommodation services, art, entertainment, and recreation and retail trade were used in the study. This is because stadiums are expected to have a profound influence on these industries. It allows for a wider range of impact to be observed across a number of stadium related industries.

Percent change in national GDP (measured in current dollars) is included in the dependent variable to account for the influence of national economic trends on local economic performance. Percent change in establishments, employment, and wages is descriptive of a local economy. National GDP was subtracted into the dependent variables because in running preliminary multiple regression models, seen in full in Appendix A, it became apparent that national GDP has a significant impact on the change in employment, establishments and wages. It is important to note that the preliminary regression models utilized the change in the sum of establishments, employment, and wages instead of the percent change for the dependent variable. When originally running stadium presence models, change in national GDP was included in the independent variables. This was done to control for national economic performance. Upon running these preliminary regression models, it became apparent that the change in national GDP had an extremely significant effect on the change in establishments, employment, and wages.

Thus it was determined that it was best to include the percent change in national GDP in the dependent variable.

The need to control for national economic trends warrants the decision to include national GDP in the dependent variable. By doing this, the model recognizes the impact of national economic trends and allows for us to find the relationship between a soccer stadium and the local economy. The dependent variable describes how the local economy performed after subtracting the influence of the national economy. If the dependent variable is negative, the local effect on the economy is negative. If the dependent variable is positive, the local effect of the economy is positive. For example, if the local economy grew by 3% and the national economy grew by 2%, the local effect is 1% (positive). It can be insinuated that something local is causing the economy to grow faster than the national economy. If the local economy grew by 1% and the national economy grew by 2%, the local effect is -1% (negative). Here, it can be insinuated that something local is causing the economy to grow more slowly than the national economy.

Table 4.3. Dependent variables included in Stadium Presence.

City	Years for Change	Percent Change in Establishments minus National GDP	Percent Change in Employment Minus National GDP	Percent Change in Wages minus National GDP
Portland, OR	2012-2010	-4.24 %	-2.24 %	1.94 %
Sacramento, CA	2012-2010	-8.93 %	-3.25 %	-1.10 %
Santa Clara, CA	2009-2007	-1.16 %	-5.27 %	- 12.79 %
San Mateo, CA	2009-2007	.80 %	-5.64 %	- 7.64 %
Carson, CA (Galaxy)	2004-2002	-9.43 %	-8.62 %	-0.64 %
Westminster, CA	2004-2002	-9.05 %	-9.04 %	-5.30 %
Carson, CA (Chivas)	2006-2004	-8.46 %	-8.37 %	-4.49 %
Westminster, CA	2006-2004	-8.93 %	-8.16 %	-1.85 %
Sandy, UT	2009-2007	-1.15 %	-3.73 %	- 5.95 %
Edmund, OK	2009-2007	.22 %	-1.17 %	3.92 %
Commerce City, CO	2008-2006	-5.49 %	1.39 %	2.05 %
Wheat Ridge, CO	2008-2006	-10.45 %	-5.50 %	-1.84 %
Kansas City, KS	2012-2010	-7.60 %	10.67 %	17.31 %
Olathe, KS	2012-2010	-7.16 %	-3.28 %	2.39 %
Frisco, TX	2006-2004	0.13 %	10.29 %	36.92 %
Denton, TX	2006-2004	-4.91 %	-1.66 %	1.10 %
Houston, TX	2013-2011	-3.28 %	-1.14 %	2.48 %
Atlanta, GA	2013-2011	-5.18 %	-1.95 %	-1.21 %
Bridgeview, IL	2007-2005	-7.63 %	-7.71 %	-1.53 %
Miami Springs, FL	2007-2005	-10.81 %	-5.75 %	1.90 %
Columbus, OH	2000-1998	-12.15 %	9.52 %	-0.40 %
Austin, TX	2000-1998	-9.86 %	-1.98 %	13.17 %
Harrison, NJ	2011-2009	-7.50 %	-2.33 %	-2.04 %
North Arlington, NJ	2011-2009	-5.01 %	-4.88 %	-3.83 %

Chester, PA	2011-2009	-6.59 %	3.98 %	-0.65 %
West Chester, PA	2011-2009	-7.70 %	-7.17 %	-1.67 %

Quarterly Census of Employment and Wages. (2014).Published by Bureau of Labor Statistics

Table 4.4. Dependent Variables used in Stadium Characteristics.

Soccer City	Years for Change	Percent Change in Establishments minus National GDP	Percent Change in Employment minus National GDP	Percent Change in Wages minus National GDP
Portland, OR	2012-2010	-4.24 %	-2.24 %	1.94 %
Santa Clara, CA	2009-2007	-1.16 %	-5.27 %	-12.79 %
Carson, CA (Galaxy)	2004-2002	-9.43 %	-8.62 %	-0.64 %
Carson, CA (Chivas)	2006-2004	-8.46 %	-8.37 %	-4.49 %
Sandy, UT	2009-2007	-1.15 %	-3.73 %	-5.95 %
Commerce City, CO	2008-2006	-5.94 %	1.39 %	2.05 %
Kansas City, KS	2012-2010	-7.60 %	10.67 %	17.31 %
Frisco, TX	2006-2004	-0.13 %	10.29 %	36.92 %
Houston, TX	2013-2011	-3.28 %	-1.14 %	2.48 %
Bridgeview, IL	2007-2005	-7.63 %	-7.71 %	-1.53 %
Columbus, OH	2000-1998	-12.15 %	-9.52 %	-0.40 %
Harrison, NJ	2011-2009	-7.50 %	-2.33 %	-2.04 %
Chester, PA	2011-2009	-6.59 %	-3.98 %	-0.65 %
Seattle, WA	2008-2010	-0.98 %	-7.00 %	-4.19 %
Foxborough, MA	2001-2003	-5.57 %	-7.20 %	-1.20 %
Washington D.C.	1995-1997	-23.31 %	-19.60 %	-10.37 %

Quarterly Census of Employment and Wages. (2014).Published by Bureau of Labor Statistics

Both multiple regression analysis measure economic impact of a stadium through the dependent variable of percent change in the sum in establishments, employment, and wages minus the percent change in national GDP. The models differ in the independent variables used in the models. Reasoning for independent variables will be discussed next.

Stadium Presence Independent Variables

Stadium presence compares the dependent variables found in the 13 cities with soccer specific stadiums with 13 similar cities. A stadium indicator variable was assigned to cities with soccer specific stadiums. If the stadium variable has a significant relationship to the dependent variables, then an understanding of the presence of soccer specific stadiums on economic performance can be had. As the literature review showed, controlling for national and local economic trends allows for a more true representation of the data to come through. Stadium presence controls for national economic trends by including the percent change in national GDP in the dependent variable. In order to control for local economic trends, the sum in the change in employment before and after a stadium was built in the industries of manufacturing, finance and insurance services, and professional and scientific services is used. This metric looks at employment in industries not related to soccer stadium development. An increase in jobs in these industries is not expected because a stadium was built. Local trends are also accounted for by comparing the change in per capita income before and after the stadium was built. This metric helps to detail the overall local economic health. The change in population for each city also is included in the control for local trends. Change in the independent variables is measured a full year before stadium construction and a full year after stadium construction. Table 4.5 provides the 13 cities with soccer specific stadiums and the 13 comparable cities along with the independent variables used in stadium presence.

Table 4.5 Stadium presence independent variables.

City	Years for Change	Sum of Change in Local Employment **	Change in Population ***	Change in Personal Income ^	Stadium Variable
Portland, OR	2012-2010	5,554	21,663	3,682	1
Sacramento, CA	2012-2010	-13,732	26,000	3,551	0
Santa Clara, CA	2009-2007	-20,457	61,000	-5,939	1
San Mateo, CA	2009-2007	-4,823	21,650	-6,916	0
Carson, CA (Galaxy)	2004-2002	-41,664	90,000	2,513	1
Westminster, CA	2004-2002	17,395	39,000	4,276	0
Carson, CA (Chivas)	2006-2004	15,075	-47,000	4,876	1
Westminster, CA	2006-2004	12,131	-3,000	6,592	0
Sandy, UT	2009-2007	-6,876	33,000	-1,733	1
Edmund, OK	2009-2007	-3,189	17,181	-1,193	0
Commerce City, CO	2008-2006	-876	20,065	1,477	1
Wheat Ridge, CO	2008-2006	2024	8,788	1,742	0
Kansas City, KS	2012-2010	-714	1,402	1,691	1
Olathe, KS	2012-2010	4,065	14,140	5,454	0
Frisco, TX	2006-2004	21,135	71,927	4,469	1
Denton, TX	2006-2004	3,584	56,559	4,890	0
Houston, TX	2013-2011	36,743	160,000	3,545	1
Atlanta, GA	2013-2011	2,998	34,516	2,177	0
Bridgeview, IL	2007-2005	-6,635	-33,000	5,788	1
Miami Springs, FL	2007-2005	905	40,000	3,696	0
Columbus, OH	2000-1998	13,751	21,000	3,530	1
Austin, TX	2000-1998	13,212	59,441	4,295	0
Harrison, NJ	2011-2009	-637	47,189	5,417	1
North Arlington, NJ	2011-2009	-34	12,501	3,374	0
Chester, PA	2011-2009	1,103	1,030	3,723	1
West Chester, PA	2011-2009	-64	4,666	4,964	0

** *Quarterly Census of Employment and Wages*. (2014).Published by Bureau of Labor Statistics.

*** *Population Estimates.* (2015). U.S. Department of Commerce

^ *Bureau of Economic Analysis.* (2014). U.S. Department of Commerce, Regional Economic Accounts

Stadium Characteristics Independent Variables

Stadium characteristics compares the dependent variables found in the 16 soccer cities with four independent variables. The four independent variables include the successful sports stadium characteristics and a control variable for the local economy. Successful sports stadium characteristics have been determined through the best practice analysis and are believed to have a positive influence on the economic vitality of sports stadiums. The best practice analysis found that successful stadiums generally share the following three characteristics.

1. The stadium is located in or directly adjacent to the Central Business District (CBD).
2. The stadium is serviced by public transportation including light rail, subway, streetcar, and bus rapid transit (BRT). This does not include regular, fixed route bus transportation.
3. The stadium must is integrated into the fabric of the city and is not surrounded by surface parking lots.

The first independent variable asks if the stadium is located in or directly adjacent to the Central Business District. Distance to the CBD is measured through the use of Google Earth and is calculated by measuring the network distance in miles from the stadium to the CBD. The CBD for each city was determined through the Google definition for each city's CBD. The inverse of the network distance is used in the formula to rate stadiums that are within or adjacent to the CBD higher than stadiums located away from the CBD.

The second independent variable measures if the stadium is serviced by public transportation. Access to public transportation is measured by finding the distance in miles from the stadium to the closest BRT, light rail, subway, or streetcar station. Google Earth is used to

measure this variable. If a city features a rapid shuttle bus from the stadium to a public transportation station, the rapid shuttle will be considered a BRT. The inverse of the distance to the nearest public transportation station was used to rate stadiums with direct access to public transportation higher than stadiums with limited or no access to public transportation.

The third independent variable asks if the stadium is a part of the fabric of the city. Measuring how the stadium is integrated into the city is achieved through measuring the amount of surface parking lots in acres that surround the stadium. Surface parking lots are measured through the use of Google Earth. The total amount of surface parking surrounding the stadium is used to rate stadiums with little surface parking higher than stadiums surrounded by surface parking lots. Table 4.6 highlights the relationship of each independent variable to the 16 cities in the study.

Preliminary regression models, seen in appendix A, indicated that change in per capita income may have an influence on the change in the dependent variable. Change in per capita income has been included in this model to control for local economic trends. National economic trends are controlled for by including the percent change in national GDP in the dependent variable. Change in per capita income (current dollars) can be seen in table 4.6.

Table 4.6 Stadium Characteristics Independent Variables.

Soccer City	Distance to CBD (network miles)*	Distance to Public Transit (network miles)*	Amount of Surface Parking (acres)*	Change in Per Capita Income (current dollars) **
Portland, OR	.6	.016	1.06	3682
Santa Clara, CA	3.7	.19	1.2	-59.9
Carson, CA (Galaxy)	16.3	2.7	27.19	2513
Carson, CA (Chivas)	16.3	2.7	27.19	4876
Sandy, UT	13.8	.48	4.87	-1733
Commerce City, CO	8.5	7.7	26.98	1477
Kansas City, KS	15.3	.1	5.38	1691
Frisco, TX	27.9	16	16.89	4469
Houston, TX	1.1	1.1	12.12	3545
Bridgeview, IL	14.7	.016	16.89	5788
Columbus, OH	4.1	--	34	3530
Harrison, NJ	13.1	.016	25.22	5417
Chester, PA	21	.016	13.12	3723
Seattle, WA	1.1	.2	4.79	-3298
Foxborough, MA	27.9	--	107.77	491
Washington D.C.	4.1	.45	27.01	3836

*Google Earth. (2014)

** *Bureau of Economic Analysis.* (2014). U.S. Department of Commerce, Regional Economic Accounts

Chapter 4 establishes the population study, independent and dependent variables and the formulas to be used in the two regression models. The results of the stadium presence regression analysis and Stadium characteristics regression analysis are given in Chapter 5.

Chapter 5 – Final Score

Two regression models were used to determine the relationship between the economic impact of soccer stadiums and economically successful sports stadium characteristics. The first model, titled stadium presence, was used to determine if soccer stadiums can have an economic impact. Stadium presence consisted of 3 multiple regression models that examined 26 cities, 13 cities that house soccer specific stadiums and 13 comparable cities. The second series of multiple regression models, titled stadium characteristics, were used to understand the relationship between successful sports stadium characteristics and the economic impact of sports stadiums. The results from preliminary regression models used to structure the final regression models will be displayed first. The results from stadium presences will be provided next. Finally the results from stadium characteristics will be provided.

Preliminary Regression Results

Appendix A displays the results of all regression models run, including preliminary models that were rejected for final analysis. In developing the two regression models used for the final analysis, a number of preliminary regression models were run. These models paved the way towards the final two models. Table 5.1 displays the results of the preliminary regression models that lead to the inclusion of the change in national GDP in the dependent variable. The preliminary regression models displayed in table 5.1 used the change in the sum in the dependent variables and included national GDP in the independent variables as a control for the national economy.

Table 5.1. Preliminary regression models substantiating the need to include national GDP in the dependent variable.

Model	1	2	3
Dependent	**Change in the Sum of Establishments**	**Change in the Sum of Employment**	**Change in the Sum of Wages**
Change in Population	-.001	.033	1.736
Change in Per Capita Income	-.074	-.820	-12.257
Change in Nat'l GDP	**.878 ***	**17.76 ****	**835.746 ***
Change in Local Employment	.002	.095	-9.179
Stadium Dummy	215.27	1718.108	183462.105
Distance to CBD			
Distance to Public Transit			
Amount of Surface Parking			
N	26	26	26
R^2	0.277	0.536	0.379
Adjusted R^2	0.12	0.435	0.244
R	0.526	0.732	0.616
Std. Error of Estimate	499.02649	7750.5666	520096.0403

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

= not included in model

Numbers in the cells are the beta values

National GDP (current dollars) as an independent variable showed a high level of significance in this model. Because of this result of the need to include national GDP in the dependent variable is warranted.

Stadium Presence Results

The results of stadium presence are displayed in table 5.2. No real significance is determined from the relationship between soccer specific stadiums and the percent change in either establishments, employment, or wages minus the percent change in national GDP. All 3 models had a total of 26 observations and used the same independent variables of change in population, change in per capita income, change in the sum of local employment in the industries of manufacturing, finance and insurance services, and professional and scientific services, and a dummy variable representing cities that housed a soccer specific stadium. Only when the dependent variable was the percent change in establishments minus the percent change in national GDP, were any of the independent variables significant. Change in per capita income showed a high level of significance in its relationship to the percent change in establishments. No other independent variable had any level of significance with any of the dependent variables. Percent change in establishments minus percent change in national GDP had a R^2 value of .372 and an adjusted R^2 value of .267. Percent change in employment minus percent change in national GDP had a R^2 value of .126 and an adjusted R^2 value of -0.02. Percent change in wages minus percent change in national GDP had an R^2 value of .214 and an adjusted R^2 value of 0.083. With both the R^2 and adjusted R^2 values being so low for all three models, little variation in the economic performance is explained by the presence of a stadium. None of the independent variables except national GDP showed any significance. Of particular importance was the stadium indicator variable as it allows for an understanding of the effect of a soccer stadium to be seen. Because no significance was shown between the independent variable of the stadium indicator and the dependent variable no relationship can be determined between soccer stadiums and economic performance. These results largely mirror findings from other sports stadium

studies. According to the three regression models used in the stadium presence, it can be expected that soccer stadiums will have an insignificant impact on the county that houses the stadiums economy. Table 5.2 shows the results of stadium presence regression models. Discussion of the implication of the results will occur in Chapter 6.

Table 5.2 Stadium presence results.

	Model	1	2	3
	Dependent Variable	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Independent Variables	Change in Population	2.747 E-7	3.58E-07	5.385 E-7
	Change in Per Capita Income	**-8.433 E -6 *** **	-1.622 E-6	6.25E-06
	Change in Nat'l GDP			
	Change in Local Employment	5.64E-07	9.07E-07	1.50E-06
	Stadium Dummy	-.004	0.006	0.019
	Distance to CBD			
	Distance to Public Transit			
	Amount of Surface Parking			
	N	26	26	26
	R^2	0.372	0.126	0.214
	Adjusted R^2	0.267	-0.02	0.083
	R	0.61	0.355	0.462
	Std. Error of Estimate	0.0412056	0.0570572	0.0874634

Gray Cells = not included in model

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

Numbers in the cells are the beta values

Stadium Characteristics Results.

With the influence of soccer stadiums on the economy being determined, the next step was to test the relationship between economically successful sports stadium characteristics and the realized economic impact of soccer stadiums. Stadium characteristics consisted of three separate regression models testing three different dependent variables. The three dependent variables were the percent change in establishments minus the percent change in national GDP, percent change in employment minus the percent change in national GDP, and percent change in wages minus the percent change in national GDP. The percent change in establishments, employment, and wages come from the industries of food and accommodation services, art, entertainment, and recreation and retail trade. All three models featured the same set of four independent variables. One of the four independent variables, change in per capita income, was included in all three regression models as a control for the local economy. The other independent variables included in all three models were the successful sports stadium characteristics; inverse distance to Central Business District from the stadium, inverse distance to Public Transportation from the stadium, and amount of Surface Parking surrounding the stadium. In running the three separate multiple regression models, no level of significance can be determined between the dependent variables of percent change in establishments, employment, or wages minus percent change in national GDP and the successful stadium characteristics. There were 16 observations in the stadium characteristics models. The R^2 value for percent change in establishments minus percent change in national GDP was .226 and the adjusted R^2 value was -0.056. The R^2 value for the percent change in employment minus the percent change in national GDP was .132 and the adjusted R^2 value was -0.184. The R^2 value for the percent change in wages minus national GDP was .197 and the adjusted R^2 value was -0.095. Across all three models, the R^2 and adjusted R^2

values are too low to expect any variation in the dependent variables because of the presence of stadium characteristics. None of the independent variables are significant and a no relationship can be discerned between the successful sports stadium characteristics and soccer stadiums. Table 5.3 displays the results from the second set of regression models testing to find the relationship between successful sports stadium characteristics and the economic impact of soccer stadiums. The implication of the results of these models is further discussed in chapter 6.

Table 5.3. Stadium Characteristics results.

Model	1	2	3
Dependent Variable	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Independent Variables			
Change in Population			
Change in Per Capita Income	-0.001	0	0.001
Change in Nat'l GDP			
Change in Local Employment			
Stadium Dummy			
Inverse Distance to CBD	-0.007	-0.033	-0.078
Inverse Distance to Public Transit	-1.05E-05	-0.001	0.001
Amount of Surface Parking	0	-0.001	-0.001
N	16	16	16
R^2	0.226	0.132	0.197
Adjusted R^2	-0.056	-0.184	-0.095
R	0.475	0.363	0.444
Std. Error of Estimate	0.0580375	0.0800412	0.1212477

Significance Rubric = not included in model

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

Numbers in the cells are the beta values

Chapter 6 – Post Game Analysis

As a result of the two regression models run in chapter 5, no significance can be found between economically successful sports stadium characteristics and the economic impact of soccer stadiums. This chapter will provide an analysis of the results of the study, suggest future research focuses, and provide an analysis of alternatives.

Analyzing the Results

This study aimed to understand the relationship between successful sports stadium characteristics and the economic impact of soccer stadiums. The first regression models run, stadium presence, showed that soccer specific stadiums have no significant impact on local economy. The second regression models, stadium characteristics, showed no significance between successful sports stadium characteristics and soccer stadium economic impact. These results are not surprising. As the literature review (Chapter 3) noted, the majority of sports stadium studies that focus on the economic impact of sports stadiums find little to no significance in the relationship between sports stadiums and economic development. This is particularly true for stadiums that are conducted at a national scale. Studies conducted at a national scale attempt to capture trends that stand out at a national level and often these studies employ a regression model to understand the economic impact of stadiums. The results from this stadium study hold many of the same characteristics and achieve similar results as other national studies that employ a regression model.

On the whole, this study approached the subject of sports stadiums as tools of economic development from a unique perspective. Firstly, this study identified the emerging form of soccer specific stadiums in the United States. The rapid development of soccer lends itself well to this

study. As this project was being conducted, Major League Soccer was announcing plans of expansion. Soccer specific stadiums, because of their relative youth, have not been studied in great detail. This project is the first foot in the door of studying the economic impact of soccer stadiums. Secondly, economic studies of sports stadiums often only ask the question of what is the economic impact of sports stadiums on the municipalities that build them. This project asked a more advanced question, in regards to sports stadiums, in that it looked to find the relationship between successful sports stadium characteristics and the economic impact of soccer stadiums. Traditional economic studies of sports stadiums look to understand the economic impact of stadiums in order to justify public investment in stadiums. This base level, to build or not to build, question is a good start for stadium research. However the need to expand on this level question is high.

Knowledge of the dilemma associated with sports stadiums is becoming popular knowledge. It is becoming increasingly well known that sports stadiums have very little impact on the economy. The need to move past this base level question is answered in this project. This project is relatively unique in that it worked on a level of assumption that cities are going to build sports stadiums regardless of what economic research says. This assumption is backed up in literature such as deMause & Cagan's book *Field of Schemes*. Understanding that cities in the foreseeable future will continue to build stadiums, this study looked to find ways in which public investment in stadiums can result in the stadium having a positive economic impact. The study attempted to do that by comparing successful sports stadium characteristics to realized impact of soccer stadiums. This study acknowledge that there is relative gap in research between what is thought to make sports stadiums successful and the actual economic success of sports stadiums that employ successful stadium techniques. This study is particularly suited to city planning as it

looks to see how city planning actions can strengthen the economic performance of sports stadiums.

Although this study did not find significance in the relationship between successful sports stadium characteristics and the economic impact of soccer stadiums, the study still has some usefulness. The need to think of sports stadiums in a different context comes through in this study. Sports stadiums, from a major city's perspective, are something that will continue to be built and be present. City planners need to move away from a rational planning framework and need to become more innovative and adaptive to the stadium that their cities either house or are looking to house. In addressing stadiums, cities can no longer look at stadiums as tools in the cities theoretical economic development tool belt. City planners need to realize that stadiums cannot stand alone as tools of economic development. City planners must be innovative and adaptive to the stadium or stadiums that their cities house. Although there is no significance in the relationship between the economic impact of soccer stadiums and the three successful stadium characteristics of locating the stadium near the CBD, locating the stadium near public transportation and building the stadium into the context of the city, planners when faced with task of planning for a soccer stadium should look to encourage these practices. Planners have an unique skill set and expertise to promote accessibility, mobility, economic development and good urban design, all of which can be achieved through promoting the three successful sports stadium characteristics. Because this study found no significance in what is theorized as successful sports stadium characteristics does not mean that planners should not try to include these characteristics in planning for soccer stadiums. Rather, planners must continue to research and discover new ways to promote ideas such as accessibility, mobility, economic development, and good urban design within a plan for a soccer stadium.

Ideas for Future Research

As stated in chapter 2, Major League Soccer will expand to 24 teams by 2020 with an addition of 5 more teams in the United States. The need to continue to monitor the economic performance of soccer stadiums is important as soccer continues to gain in popularity. Research into the economic impact of minor league soccer stadiums is needed. Research into soccer related infrastructure such as academy facilities and the US Soccer National Training Center being built in Kansas City, KS is needed. Furthermore, understanding the economic impact of soccer stadiums as concert venues and as facilities for other uses besides soccer games is important.

Sports stadium studies in general also may benefit from a change in approach. Currently sports stadium studies focus heavily on the economic impact of sport stadiums. This is largely because sports stadiums are financed on the notion that they will create a positive economic impact. As more and more research shows, stadiums do not usually result in an economic impact of any kind. It may be beneficial for future sports stadium studies to take a more holistic approach to understanding how sport stadiums impact cities. Understanding the social, psychological, political, environmental and economic impact of a stadium as a whole may provide a better understanding of the true impact of a stadium. A holistic approach to studying stadiums may result in stadiums being seen as a more positive public investment.

Analysis of Alternatives

This study utilized an abundance of data and analysis to attempt to answer the research question. This study was completed within its timetable and attempted to answer the research question that was posed. However, there were some limitations to the research and it is important that those limitations be noted in this study.

The study suffered from an availability of data. Because some of the cities were not the principal cities in their MSA and were of a relatively small population size gathering data at the city level was not feasible. Because of this, data was gathered at the county level and this may have harmed the results. The range of population and economic health of the counties observed in this study varied greatly. Because of this it was difficult to find common ground amongst the study population. In the same way that the relative youth of the study made the study relevant, the lack of observable time of the study population affected the study. The study size consisted of 16 soccer stadiums which is a small observation size for a multiple regression analysis. By the same token, the years that soccer stadiums have been active are relatively short with the oldest stadium being active in 1995. Furthermore, the oldest soccer specific stadium was built in 1999 making the sample of soccer specific stadiums limited. As time passes and more stadiums are built and more stadium related data becomes available, a study similar to this one may become more useful.

This study attempted to discover the relationship between the economic impact of soccer stadiums and economically successful sports stadium characteristics. The study aimed to equip city planners with an understanding of how to plan for soccer stadiums in order to make soccer stadiums economically successful. This study was exploratory; it asked if planning actions such as locating a soccer stadium near the CBD, public transit or within the context of the city have

any effect on the economic impact of the soccer stadium. This study notes that stadium development, particularly soccer stadium development, will continue in the United States and that city planners must continue to look for ways to better plan for soccer stadiums. Soccer stadiums represent a new form of stadium that is being built in cities across the United States. It is up to city planners to find and discover the best ways to ensure that soccer stadiums have a positive economic impact. It is with this thought that city planners have a great opportunity in front of them to change the conversation about sports stadiums and to discover new ways to foster change in their cities through the use of soccer stadiums.

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Appendix A - All Regression Models

The process used to develop the 3 regression models for stadium presence and stadium characteristics came from the process shown below. A number of preliminary regression models were run and tested. Staying within the confines of the results of the literature review, the preliminary regression models were used to inform the decision on the final 6 regression models used in the study.

First, Original 3 Regression Models

The table below, Table A.1. represents the first 3 regression models used in this study. These regression models formed the basis of stadium presence. They clearly highlight the influence that national GDP has the local economic indicators. Because of these three models, the decision to include national GDP in the dependent variable occurred.

Table A1. First 3 preliminary regression models.

Model	1	2	3
Dependent	**Change in the Sum of Establishments**	**Change in the Sum of Employment**	**Change in the Sum of Wages**
Change in Population	-.001	.033	1.736
Change in Per Capita Income	-.074	-.820	-12.257
Change in Nat'l GDP	**.878 ***	**17.76 ****	**835.746 ***
Change in Local Employment	.002	.095	-9.179
Stadium Dummy	215.27	1718.108	183462.105
Distance to CBD			
Distance to Public Transit			
Amount of Surface Parking			
N	26	26	26
R^2	0.277	0.536	0.379
Adjusted R^2	0.12	0.435	0.244
R	0.526	0.732	0.616
Std. Error of Estimate	499.02649	7750.5666	520096.0403

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

= not included in model

Numbers in the cells are the beta values

Dependent Variable Change to Percent Change, Stadium Presence

Following the results of the original 3 regression models, Table A.2, seen below, was run to determine the relationship between soccer specific stadiums and economic performance. stadium presence showed very little significance in the influence of a soccer stadium on the local economy.

Table A.2. Significance of Test.

Model	1	2	3
Dependent Variable	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Independent Variables			
Change in Population	2.747 E-7	3.58E-07	5.385 E-7
Change in Per Capita Income	**-8.433 E -6 *****	-1.622 E-6	6.25E-06
Change in Nat'l GDP			
Change in Local Employment	5.64E-07	9.07E-07	1.50E-06
Stadium Dummy	-.004	0.006	0.019
Distance to CBD			
Distance to Public Transit			
Amount of Surface Parking			
N	26	26	26
R^2	0.372	0.126	0.214
Adjusted R^2	0.267	-0.02	0.083
R	0.61	0.355	0.462
Std. Error of Estimate	0.0412056	0.0570572	0.0874634

= not included in model

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

Numbers in the cells are the beta values

First Stadium Characteristics models

The following 3 regression models were the first 3 stadium characteristics models used to test the relationship between the dependent variables and successful sports stadium characteristics. These regression models can be seen in Table A.3. This model was incredibly misleading. It showed significance in relationship between two of the successful sports stadium characteristics and the economic indicators. Upon further investigation, it became clear that this relationship was due to the distribution of the amount of surface parking and the distance to public transit at each stadium. The distribution of these two variables skewed the results of these models. Distance to CBD and public transit was similar in most observations. Because of this, unnecessary weight was given to these two observations. To combat this, the inverse in the distance to the CBD and public transit were used in subsequent models.

Table A.3. First Stadium Characteristics with skewed results.

Model	1	2	3
Dependent	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Change in Population			
Change in Per Capita Income			
Change in Nat'l GDP			
Change in Local Employment			
Stadium Dummy			
Distance to CBD	0.001	0.003	0.005
Distance to Public Transit	0.006	**.009 ***	**.019 ****
Amount of Surface Parking	**-.004 *****	**-.004 ****	**-.004 ***
N	16	16	16
R^2	0.575	0.558	0.718
Adjusted R^2	0.448	0.425	0.633
R	0.758	0.747	0.847
Std. Error of Estimate	0.0434746	0.0581996	0.0752282

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

= not included in model

Numbers in the cells are the beta values

Second Stadium Characteristics

The second Stadium characteristics utilized the inverse in the distance to the CBD, inverse in the distance to Public Transit and amount of surface parking and can be seen in Table A.4. This change allowed for a more true representation of the data. As a result, it started to become clear that there is no relationship between percent change in the economic indicators minus national GDP and the successful sports stadium characteristics.

Table A.4. Stadium Characteristic with inverse in distance to CBD and public transit.

Model	1	2	3
Dependent Variable	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Independent Variables			
Change in Population			
Change in Per Capita Income			
Change in Nat'l GDP			
Change in Local Employment			
Stadium Dummy			
Inverse Distance to CBD	-0.003	-0.031	-0.084
Inverse Distance to Public Transit	0.001	0	0
Amount of Surface Parking	-0.001	-0.001	-0.001
N	16	16	16
R^2	0.132	0.12	0.141
Adjusted R^2	-0.085	-0.099	-0.073
R	0.363	0.347	0.376
Std. Error of Estimate	0.0588407	0.0771343	0.1200264

Significance Rubric

**** < 0.001

*** < 0.01

** < 0.05

* < 0.1

" " > 0.1

= not included in model

Numbers in the cells are the beta values

Final Stadium Characteristic

Table A.5 represent the final test of re viii ip. This model was ultimately selected for the final analysis because it provides controls on a national level and at a local level. Stadium presence showed that Change in Per Capita Income may have an influence on the percent change in establishments minus the percent change in national GDP. Because of this, Change in Per Capita income was used in the final test of relationship as a form of local economic control. Table A.5 represents the fully developed, final set of 3 regression models used in the study.

Table A.5. Final 3 regression models used Stadium Characteristic.

Model	1	2	3
Dependent Variable	**Percent Change in Establishments minus Percent Change in GDP**	**Percent Change in Employment minus Percent Change in GDP**	**Percent Change in Wages minus Percent Change in GDP**
Independent Variables			
Change in Population			
Change in Per Capita Income	-0.001	0	0.001
Change in Nat'l GDP			
Change in Local Employment			
Stadium Dummy			
Distance to CBD	-0.007	-0.033	-0.078
Distance to Public Transit	-1.05E-05	-0.001	0.001
Amount of Surface Parking	0	-0.001	-0.001
N	16	16	16
R^2	0.226	0.132	0.197
Adjusted R^2	-0.056	-0.184	-0.095
R	0.475	0.363	0.444
Std. Error of Estimate	0.0580375	0.0800412	0.1212477

Significance Rubric
**** < 0.001
*** < 0.01
** < 0.05
* < 0.1
" " > 0.1

= not included in model

Numbers in the cells are the beta values